

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 July 2004 (29.07.2004)

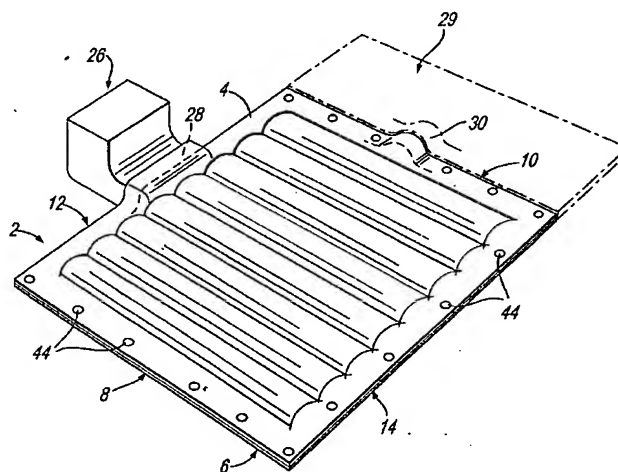
PCT

(10) International Publication Number
WO 2004/063650 A1

- (51) International Patent Classification⁷: **F26B 21/00**, (74) Agents: GAMBELL, Derek et al.; Graham Watt & Co LLP, St Botolph's House, 7-9 St Botolph's Road, Sevenoaks, Kent TN13 3AJ (GB).
E04B 1/70
- (21) International Application Number: PCT/GB2003/005655 (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (22) International Filing Date: 23 December 2003 (23.12.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
0300752.3 14 January 2003 (14.01.2003) GB
0304643.0 28 February 2003 (28.02.2003) GB
- (71) Applicants and
(72) Inventors: ELLIOTT, Jack, Bernard [GB/GB]; 88 Hawkhurst Road, Brighton, Sussex BN1 9EA (GB). ELLIOTT, David, Kenneth [GB/GB]; 24 Brompton Farm Road, Strood, Rochester, Kent ME2 3QY (GB).
- (84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report

[Continued on next page]

(54) Title: IMPROVEMENTS IN DRYING DEVICES



(57) Abstract: The invention provides a drying device for use in drying carpets, rugs after flooding or cleaning by a wet process. In addition, the drying device may be utilised for drying the fabric of dwelling, viz, the floors, walls, ceilings and under floor cavities after flooding. To these ends, the drying device, in one format is made up of opposed sheets (4, 6) of flexible material, e.g. plastic sheeting, co joined along peripheral edge portions (8, 10, 12, 14), one, or both, sheets being provided with a multiplicity of small apertures (24) over the whole, or substantially the whole area thereof. The sheets (4, 6) are joined internally by apertured webs (18) extending along the drying device to form channels (20) between the sheets. Provision is made along the peripheral edge portions (8, 10, 12, 14) of the sheets (4, 6) to attach at least one air blower (26) and to attach further drying devices (2a, 2b) using a connector means (30, 38). The air blower(s) (26) may supply drying air at ambient temperature, or heated to approx. 85°, depending upon the drying requirements.



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

5/pets
JC20 Rec'd PCT/PTO 12 JUL 2009**IMPROVEMENTS IN DRYING DEVICES**

This invention is concerned with improvements in or relating to drying devices for use in drying out flooded dwellings and for drying carpets and the like artefacts after a cleaning process.

Devices for drying out flooded dwellings are well known and conventionally comprise the use of air blowers in combination with dehumidifiers.

However, where a dwelling is flooded it often takes several months of drying before the structure of the dwelling is habitable.

Conventional air blowers are configured to blow air at ambient temperature or above in more or less one direction; however, the blowers may be used in conjunction with ancillary equipment that is attached to a blower so that some measure of control may be exercised over the surface area treated by the air blower.

US Specification No. 5,813,139 discloses an arrangement for drying carpets, in which arrangement the nozzle of an air blower is placed under an edge portion of a carpet. One or more coiled rods are threaded through the carpet at spaced intervals to raise portions of the carpet above the floor thereby creating a cavity for the passage of air for effecting the drying thereof. While this method of drying a carpet may be successful some damage may be done to carpets of a less robust nature.

The disclosure of US Specification No. 4,145,821 teaches the use of an air blower in combination with a skirt of flexible material so that air is blown over the surface of a carpet covered by the skirt. Such an arrangement may be good for drying carpets but it not very versatile in use.

A carpet drying system is disclosed in US Specification No. 5,992,051, which system comprises the use of a metal housing having an inlet port for drying air from a

compressor, the housing also being provided with a plurality of hollow needle elements depending therefrom. Air from the housing passes through the hollow needle elements and through the fibres of a carpet on which the housing is placed.

The housing of US 5,992,051 is provided with means for mutual attachment of the housing to one or more like housings for treating a larger area of a carpet, and the system of US 5,992,051, while being made up of one or more metal housings, requires a lot of strenuous effort in use and limits its application. Also the system can only be used on floor surfaces.

The present invention seeks to overcome or at least mitigate the drawbacks of the prior art drying systems.

Thus, the present invention conveniently provides a drying device comprising opposed sheets of flexible material co-joined along peripheral edge portions thereof wherein at least one of the sheets is provided with a multiplicity of small apertures over its whole surface area, or substantially so, the drying device also comprising connector means for the attachment of an air blower thereto, whereby, when the drying device is in use, air from an air blower is fed between said sheets and through said apertures to remove moisture from a surface to be dried.

Preferably, the opposed sheets of flexible material may be co-joined by webs extending therebetween to form longitudinal channels between said sheets.

Conveniently, the webs may be provided with perforations to facilitate, when in use, the even distribution of air from an air blower attached to the drying device.

The connector means may conveniently comprise edge portions of quick release material for effecting the ready attachment and detachment of an air blower thereto.

Preferably, the flexible material may be a synthetic waterproof material such as plastic.

In one arrangement provided by the present invention, the drying device may conveniently comprise support means, effective when the drying device is in use, to position the drying device adjacent a wall or a ceiling to be dried.

In a further arrangement provided by the present invention the drying device may comprise a connector for co-joining one drying device with another like drying device.

Conveniently, the connector may be provided by a collar of flexible material having quick release surface portions for ready attachment and detachment to and from each drying device.

Preferably, the opposed, flexible sheets may be rectangular in shape or substantially so.

The present invention also conveniently provides a method of drying a carpet after cleaning or after immersion in water comprising the steps of:

- a) placing a drying device according to any one of last nine preceding paragraphs with a sheet having apertures therein overlying a carpet;
- b) attaching an air blower to the drying device; and,
- c) blowing air into the drying device and through the apertures to dry said carpet.

The present invention further conveniently provides a method of drying a dwelling after the ingress of water thereto comprising the steps of:

- a) placing a drying device according to the last nine but one preceding paragraphs with a sheet, or sheets, having apertures therein against a surface, or between surfaces to be dried;
- b) attaching an air blower to the drying device; and,
- c) blowing air into the drying device and through the apertures in the sheet or sheets to dry said surface or surfaces.

The surface to be dried by the method of the last preceding paragraph may be:

- a) a floor; or,
- b) a wall; or,
- c) a ceiling; or,
- d) those surfaces bounding a closed space between floorboards and a concrete base or the like.

Preferably, in the method according to any one of the last three preceding paragraphs the air is heated to above ambient temperature; more preferably, the air is heated to over 85 degrees C.

There now follows by way of example of the present invention a detailed description of a drying device and its method of use, which description is to be read with reference to the accompanying drawings in which:

Figure 1 is an underside plan view of a drying device;

Figure 2 is a plan view of a connector for use with the drying device of Figure 1;

Figure 3 is an upper plan view of the drying device of Figure 1;

Figure 4 is an underside plan view of a complementary drying device;

Figure 5 is an upper plan view of the complementary drying device of Figure 4;

Figure 6 is a plan view of another connector;

Figure 7 is a diagrammatic upper perspective view showing a portion of an inflated drying device; and,

Figure 8 is an upper perspective view of co-joined drying devices of the invention.

The drying device 2 of the present invention is intended for use in very many different applications including:

- a) drying carpets, rugs and other similar floor coverings that have been immersed in water due to flooding;
- b) drying carpets, rugs and other similar floor coverings that have been cleaned by a wet process; and,
- c) drying the fabric of a dwelling, that is the floors, walls, ceilings, under-floor cavities and fittings.

As will be made clear hereinafter, the drying device 2 provides a diversity of uses compared with prior arrangements due to it's ease of use and the flexible nature of the materials used in it's construction.

Thus, the drying device 2 is not unlike an inflatable beach-bed in construction and comprises upper and lower sheets 4 and 6 of waterproof material, the sheets 4 and 6 being rectangular in plan view, see Figures 1, 2 and 8.

The sheets 4 and 6, which are of the same size, or substantially so, are co-joined along peripheral side edge portions 8 and 10 and along a top edge portion 12 and a lower edge portion 14, see Figure 1, 2 and 8.

The side edge portions 8 and 10 and the lower edge portion 14 are permanently co-joined therealong except for respective mid-portions 8a, 10a and 14a, which are detachably co-joined by needle fabric, or the like, for a purpose to be described hereinafter.

The top edge portion 12 of the drying device 2 is also detachably co-joined by needle fabric, or the like, along the whole length thereof for a purpose to be made clear hereinafter.

The sheets 4 and 6 are also co-joined internally by eleven webs 18, see Figures 1, 2 and 7, which webs 18 divide the space between the sheets 4 and 6 into twelve longitudinal channels 20.

The webs 18 are each provided with apertures 22 connecting the channels 20 for a purpose to be described.

The lower sheet 6 is provided with a multiplicity of small apertures 24 over its whole surface area, see Figure 1, the purpose of which will be made clear hereinafter.

The drying device 2 is used in combination with a conventional air blower 26, see Figure 8. Thus, after laying the drying device 2 overlying a carpet or floor area to be dried, an operative attaches an air blower 26 to the drying device 2 by peeling apart the detachably co-joined top edge portion 12 thereof and placing a nozzle 28 of the air blower 26 therebetween.

The nozzle 28 of the air blower 26 is provided with needle fabric, not shown, for engagement with the needle fabric of the drying device 2 whereby the air blower 26 may be readily attached and detached therefrom. The operative closes the top edge portion about the nozzle 28 and switches on the air blower 26.

Air, at ambient temperature, or at an elevated temperature, e.g. over 85 degrees C, is blown between the sheets 4 and 6 to expand the drying device to an extent defined by the webs 16, see Figure 7. The air from the blower 26 passes along the channels 20 and therebetween by virtue of the apertures 22 so that an even distribution of the air is achieved throughout the whole of the drying device 2.

Once the drying device is expanded, as shown in Figure 7, the air passes through the multiplicity of small apertures 24 to impinge upon the carpet or floor surface to be dried.

It has been found that the time for drying a carpet using the drying device 2 of the present invention is only a fraction of the time require when using air blowers alone or in combination with ancillary attachments proposed hitherto.

In addition, because the drying device 2 is of a flexible construction, it may be used in situations where the surfaces to be dried are not flat or are normally inaccessible.

In a first modification of the drying device of the present invention, the upper sheet 4 thereof may also be provided with a multiplicity of small apertures therein so that the drying device may be placed between two surfaces to be dried, for example, the modified drying device may be positioned in an under-floor cavity to dry a base layer of concrete and the floorboards positioned thereabove.

In a second modification of the drying device 2, a collar 30 having needle fabric portions 32, see Figure 2, may be used to co-join a first drying device 2 with another like device 2a, see Figure 8. This is achieved by peeling apart the mid-portion 10a of the side edge portion 10 and fitting a first end portion 34 of the collar 30 therebetween. Likewise, an opposite end portion 36 of the collar 30 is fitted between the side edge portion of an adjacent drying device 2a, see Figure 8.

Figures 4 and 5 illustrate a smaller version 2b of the drying device 2, which smaller version 2b comprises all of the features of the larger device 2. The utility of the smaller version 2b is that it may be used alone or in conjunction with one or more larger drying devices as required.

Figure 6 illustrates an umbilical connector 38 having needled portions at opposite end portions 40 and 42 thereof for connection with one or more drying devices 2 and/or 2a and/or 2b.

Whereas the drying devices 2, 2a and 2b have been described for use on floor surfaces or the like, it will be readily appreciated that the devices may be used for drying walls and ceilings. To this end each of the drying devices 2, 2a and 2b is provided with eyelets 44 provided at spaced intervals about the peripheral edges thereof, see Figures 1, 2, 3, 4, 5, 7 and 8.

In order to dry a wall or ceiling a drying device 2 is hung against a wall or beneath a ceiling.

The needle fabric used herein may be 'Velcro' (RTM) or any other suitable means for achieving the ready attachment and detachment of the air blower 26, the collars 30 and the umbilical connectors 38 from the drying devices 2.

The material from which the sheets 4 and 6 are made is described herein as being waterproof; thus any suitable waterproof material may be used, for example plastic sheeting, rubberised canvas, rubber sheeting or the like.

Where the edge portions of the sheets are permanently co-joined, this may be achieved by stitching, gluing, heat sealing or welding dependant upon the nature of the material used for the sheets.

Likewise, the webs 16 may be co-joined between the sheets 4 and 6 by similar means.

Other modifications may be made to the drying device within the scope of the claims appended hereto, for example, the side edge portions 8 and 10 and the lower edge portion 14 may also be provided with further detachably co-joined portions similar to the mid portions 8A, 10A and 14A respectively.

CLAIMS

1. A drying device comprising opposed sheets of flexible material co-joined along peripheral edge portions thereof wherein at least one of the sheets is provided with a multiplicity of small apertures over its whole surface area, or substantially so, the drying device also comprising connector means for attachment of an air blower thereto, whereby, when the drying device is in use, air from an air blower is fed between said sheets and through said multiplicity of small apertures to remove moisture from a surface to be dried.
2. A drying device according to Claim 1 characterised in that the opposed sheets of flexible material are co-joined by a plurality of webs extending therebetween to form longitudinal channels between said sheets.
3. A drying device according to Claim 2 characterised in that the webs are each provided with perforations to facilitate, when the drying device is in use, the even distribution of air from an air blower attached to the drying device.
4. A drying device according to any one of Claims 1 to 3 characterised in that the connector means comprises edge portions of quick release material for effecting the ready attachment and detachment of an air blower thereto.
5. A drying device according to any one of Claims 1 to 4 characterised in that the flexible material is a synthetic waterproof material.
6. A drying device according to Claim 5 characterised in that the synthetic waterproof material is plastic.
7. A drying device according to any one of Claims 1 to 6 characterised in that the drying device comprises support means, effective when the drying device is in use, to position the drying device adjacent a wall or a ceiling to be dried.

8. A drying device according to any one of Claims 1 to 7 characterised in that the drying device comprises a connector for co-joining one drying device with another like drying device.
9. A drying device according to Claim 8 characterised in that the connector for co-joining one drying device with another is provided by a collar of flexible material having quick release portions for ready attachment and detachment to and from each drying device.
10. A drying device according to any one of the preceding Claims characterised in that the opposed flexible sheets are rectangular in shape or substantially so.
11. A method of drying a carpet after cleaning or immersion in water comprising the steps of:
 - a) placing a drying device according to any one of Claims 1 to 10 with a sheet having apertures therein overlying a carpet;
 - b) attaching an air blower to the drying device; and,
 - c) blowing air into the drying device and through the apertures to dry said carpet.
12. A method of drying a dwelling after the ingress of water thereto comprising the steps of :
 - a) placing a drying device according to any one of Claims 1 to 10 with a sheet, or sheets, having apertures therein against a surface, or between surfaces to be dried;
 - b) attaching an air blower to the drying device; and,
 - c) blowing air into the drying device and through the apertures in the sheet or sheets to dry said surface or surfaces.

13. A method according to Claim 12 characterised in that the surface to be dried is:

- a) a floor; or,
- b) a wall; or,
- c) a ceiling; or,
- d) those surfaces bounding a closed space between floorboards and a concrete base or the like.

14. A method according to either one of Claims 11, 12 and 13 characterised in that the air is heated to above ambient temperature.

1/5

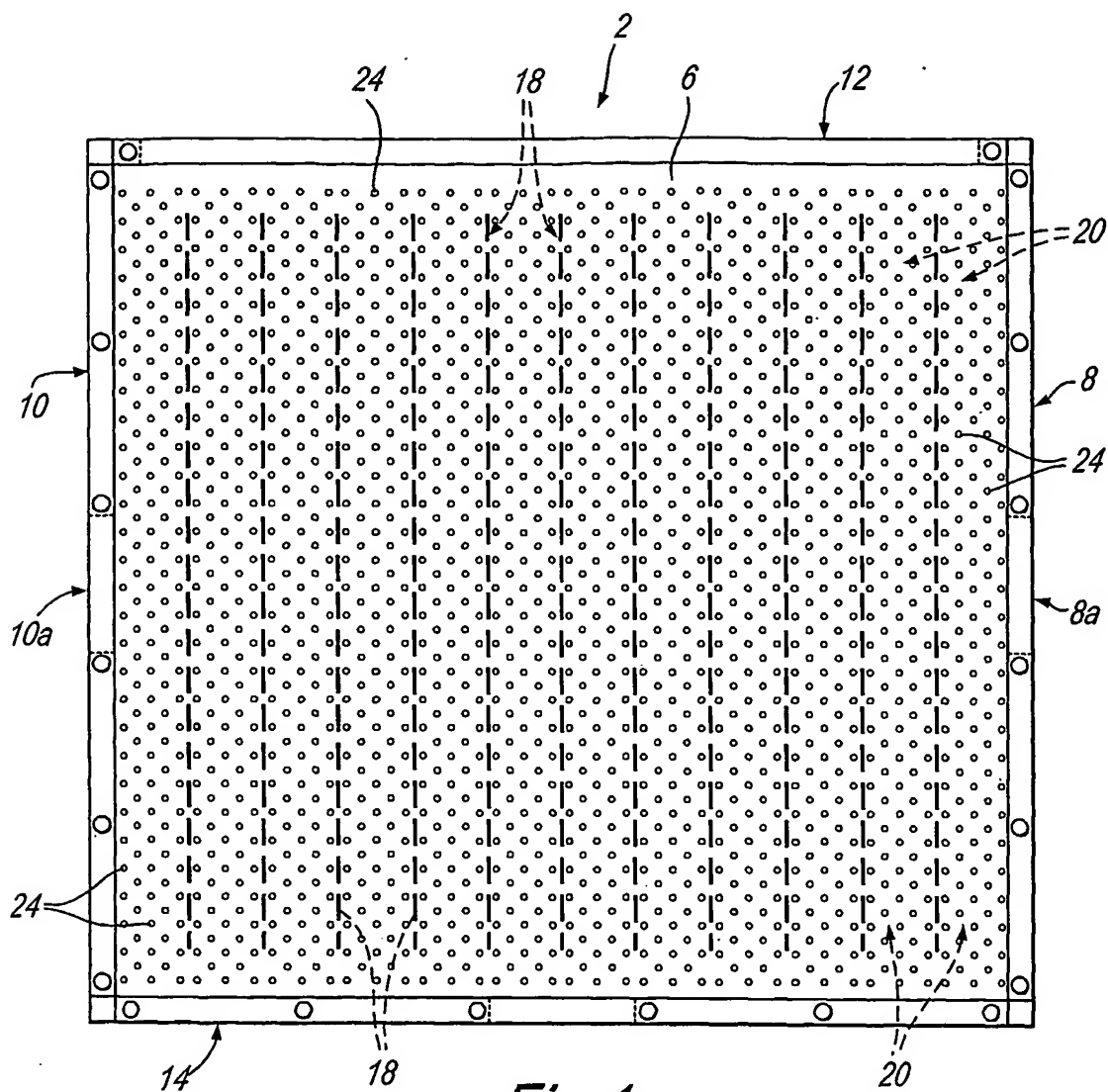


Fig. 1

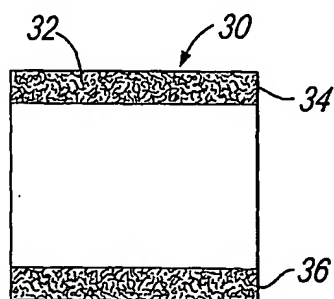


Fig. 2

2/5

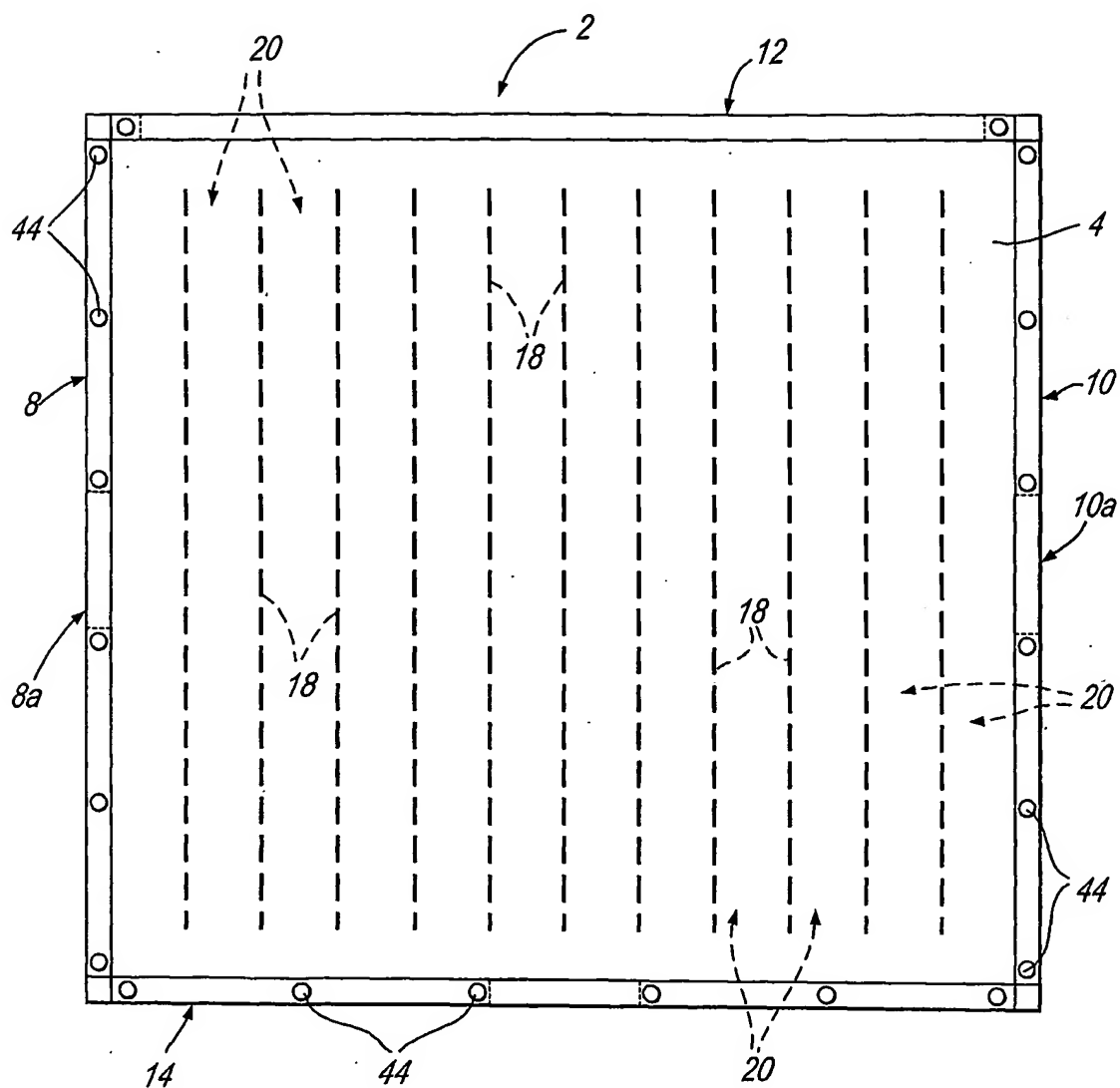


Fig. 3

3/5

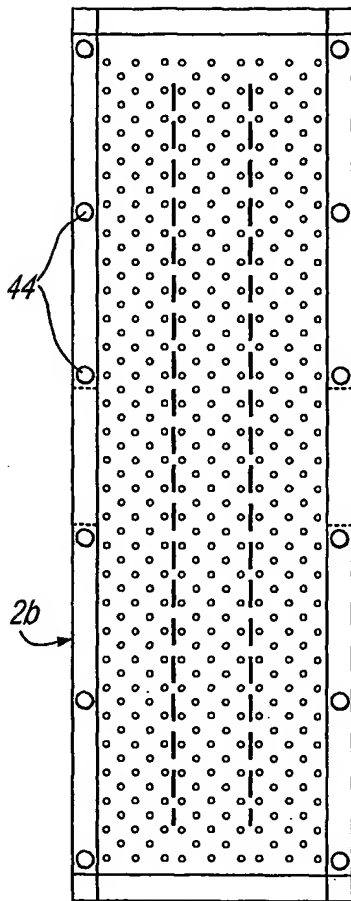


Fig. 4

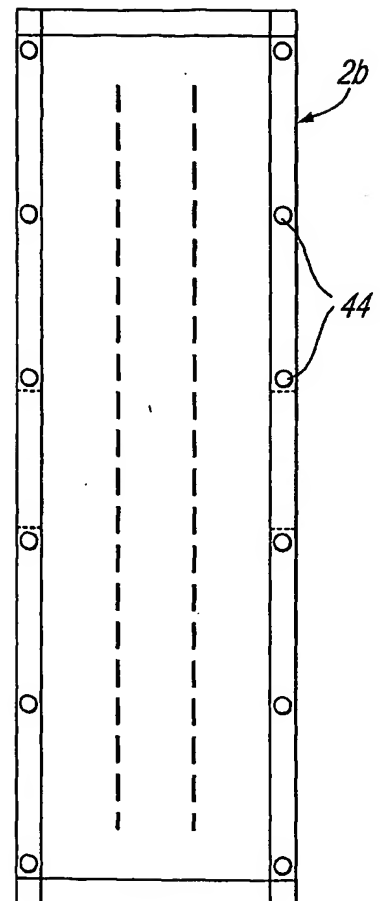


Fig. 5

4/5

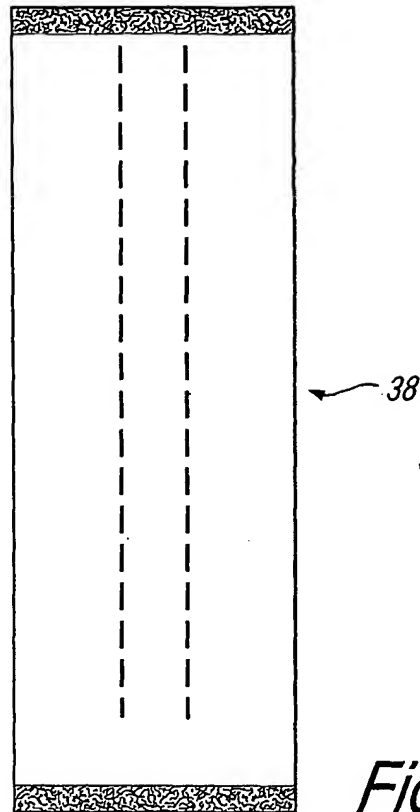


Fig. 6

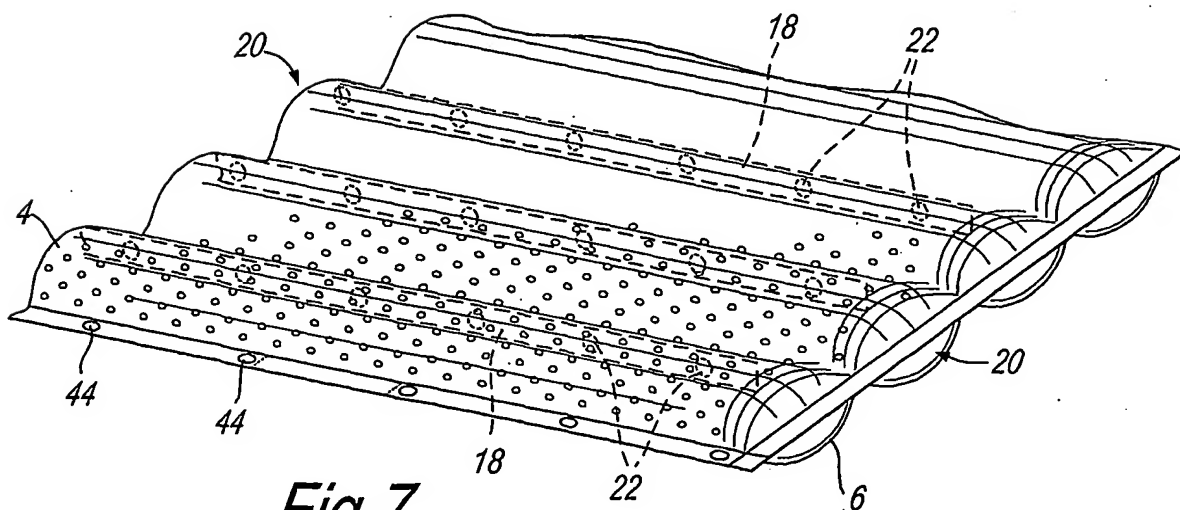


Fig. 7

5/5

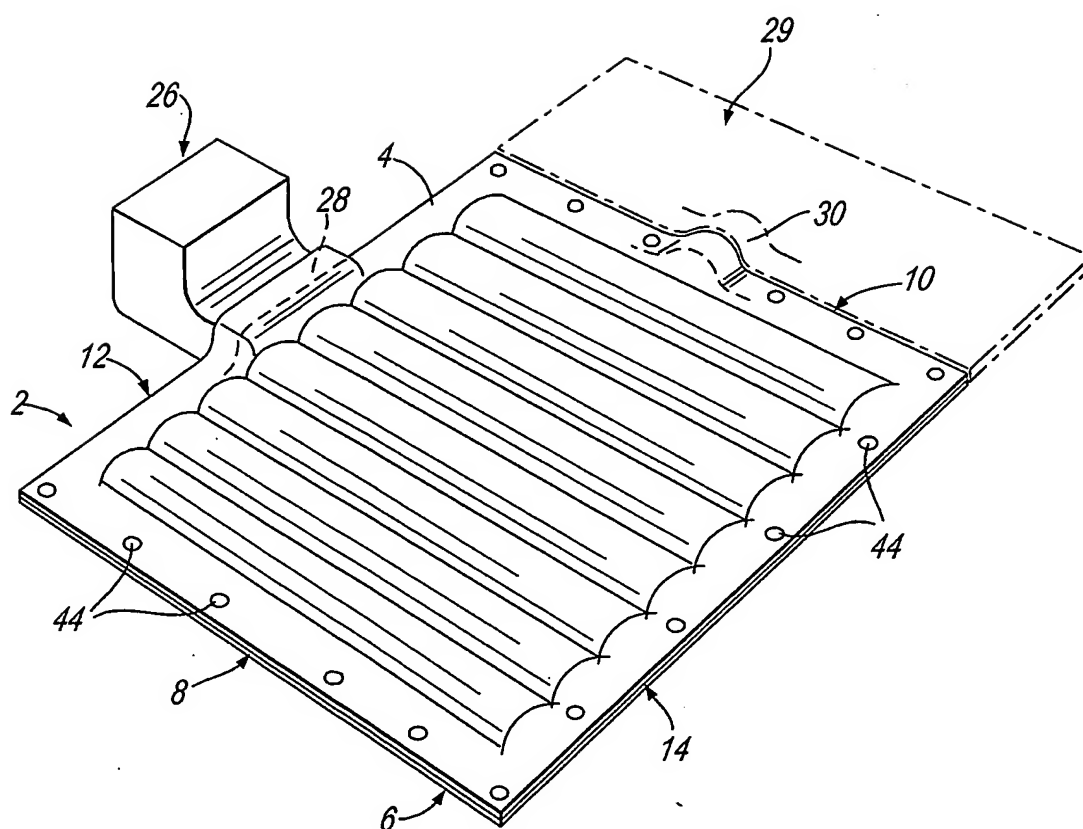


Fig. 8

INTERNATIONAL SEARCH REPORT

PCT/GB 03/05655

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F26B21/00 E04B1/70

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F26B E04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 198 30 574 A (VON BURGSDORFF KOENIG HEIKE) 13 January 2000 (2000-01-13) the whole document ---	1-3,5,6, 10
X	US 3 487 557 A (LINSTEAD LORRAINE A) 6 January 1970 (1970-01-06) the whole document ---	1,2,5,6, 10
X	FR 2 696 230 A (PRINCIPIA RECH DEV) 1 April 1994 (1994-04-01) page 6, line 11 - line 19; figure 4 ---	1,2
X	US 5 214 860 A (LANDES MARK J) 1 June 1993 (1993-06-01) the whole document ---	1,5,6
Y	the whole document ---	2-4,7-14
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

13 April 2004

Date of mailing of the international search report

13/05/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Silvis, H

INTERNATIONAL SEARCH REPORT

PCT/6B 03/05655

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	FR 2 272 804 A (CARRE PIERRAT ETS) 26 December 1975 (1975-12-26)	2,3,10
A	the whole document	7,12-14
Y	US 5 408 759 A (BASS LENNY) 25 April 1995 (1995-04-25)	4,8,9
	the whole document	
Y	US 5 893 216 A (STORRER JR ERNEST J ET AL) 13 April 1999 (1999-04-13)	7,11-14
	column 4, line 17 - line 48; figures 8,9	
A	US 6 401 354 B1 (JOHNSON LINDA JOY) 11 June 2002 (2002-06-11)	1,4-7
	the whole document	
A	US 4 151 658 A (HIBINO SHIGETOSHI ET AL) 1 May 1979 (1979-05-01)	
A	US 4 572 188 A (AUGUSTINE DOUGLAS J ET AL) 25 February 1986 (1986-02-25)	

INTERNATIONAL SEARCH REPORT

PCT/GB 03/05655

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
DE 19830574	A	13-01-2000	DE	19830574 A1	13-01-2000
US 3487557	A	06-01-1970	NONE		
FR 2696230	A	01-04-1994	FR	2696230 A1	01-04-1994
US 5214860	A	01-06-1993	NONE		
FR 2272804	A	26-12-1975	FR	2272804 A1	26-12-1975
US 5408759	A	25-04-1995	NONE		
US 5893216	A	13-04-1999	NONE		
US 6401354	B1	11-06-2002	NONE		
US 4151658	A	01-05-1979	JP	53082864 U	08-07-1978
			AU	501738 B1	28-06-1979
			CA	1077260 A1	13-05-1980
			DE	2755244 A1	02-11-1978
			FR	2373763 A1	07-07-1978
			GB	1558297 A	19-12-1979
			HK	1882 A	22-01-1982
			IT	1088519 B	10-06-1985
US 4572188	A	25-02-1986	NONE		